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## MAP ILLUSTRATING FAUNAL ZONES OF NORTH AMERICA.

Through the courtesy of Dr. H. W. Henshaw, Chief of the Biological Survey of the United States Department of Agriculture, we are enabled to publish the Fourth Provisional Zone Map of North America. This map has not yet been published by the Biological Survey, by whom it was prepared, to accompany a revised edition of their Bulletin No. 10, now in course of preparation, but has appeared in the American Ornithologists' Check List.

Our object in publishing this map is primarily to assist those engaged in the preparation of the Catalogue of the Insects of Canada and Newfoundland. (See pp. 273-275 of Vol. XLIII of this journal.) On page 274 it was stated that the geographical distribution of each species within Canada and Newfoundland will be given. "This will be indicated as a rule by Provinces, in order from east to west, e.g., N. S., Ont., B. C., etc. The characteristic faunal zones inhabited by the species will be indicated so far as it may be possible by abbreviations, thus: Ar.-Arctic, H.-Hudsonian, C.-Canadian, T.-Transitional" With the addition of Upper Austral, to be indicated by "U. A.", these are all the zones which are represented in Canada and Newfoundland, so far as we know at present. The entire map of North America has been published, as it is impossible to consider or discuss the faunal zones of Canada apart from those of the United States.

In stating the distribution of provinces, the recent extensions made to the boundaries of the Provinces of Manitoba, Ontario and Quebec should be noted. The northern boundary of Manitoba is marked by the 60th parallel, and the new north-eastern boundary is a line drawn from the north-eastern corner of the original boundaries to the shore of the Hudson Bay, where the latter is intersected by the 89th meridian. The Province of Ontario extends northward to the Hudson Bay, east of the eastern boundary of Manitoba. The Province of Quebec extends northwards, and includes the region of Ungava.

Mr. Edwin C. Van Dyke, of San Francisco, Cal., who has made a careful study of faunas of western North America, in a recent letter to me,

proposes that the following should be included in a zone to be named *Vancouverian*: That portion on the southern side of the inner Aleutian Islands, South-eastern Alaska and the Islands of the Coast, Western British Columbia, including the islands, Western Washington, the western portion of Northern Oregon, and a strip along the coast of California, to a little south of San Francisco Bay. That this zone has not been included in our scheme is not evidence of its non-acceptance, for we believe that Mr. Van Dyke's proposal is supported by a number of facts. Pending further investigation, however, we have deemed it advisable to restrict ourselves to the zones already indicated.—[C. GORDON HEWITT.]

REPORT ON THE CELEBRATION OF THE CENTENNARY  
OF THE FOUNDATION OF THE ACADEMY OF NA-  
TURAL SCIENCES OF PHILADELPHIA.

BY F. M. WEBSTER,

Delegate from the Entomological Society of Ontario.

This noted gathering was, thanks to the united efforts of the members, an entire success. The entire world of letters, personified by a company of more than one hundred distinguished men and women, representing the institutions of learnings and scientific societies of this country and Europe, participated in the ceremonies. The fine new lecture hall of the academy was given over to the carrying out of the set programme, made up of papers on purely scientific subjects, prepared and read by the distinguished delegates at the meeting.

On the platform were seated Mayor Blackenburg; Dr. Samuel G. Dixon, president of the academy; Sir James Grant, of the Royal Society of Canada; Dr. Edward J. Nolan and Dr. J. Percy Moore, the secretaries.

Among the smaller social events in connection with the centennial celebration was a dinner given by Dr. Henry Skinner, of the academy, at his home in Glenn road, Ardmore. There were present the following delegates, representing the entomologists, in which particular branch of natural science Dr. Skinner is especially interested: Dr. W. J. Holland, of the Carnegie Museum, Pittsburgh; Professor J. H. Comstock, of Cornell University; Professor C. W. Johnson, of Boston, representing the Boston Society of Natural History; E. T. Cresson, of Philadelphia, representing the American Entomological Society, of which he was founder; Dr. Philip P. Calvert, of the University of Pennsylvania, representing the Sociedad Aragonesa de Ciencias Naturales, and Professor F. M. Webster, Washington, D.C., representing the Entomological Society of Ontario.

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The address of the president, Dr. Dixon, was exceedingly gratifying to entomologists, by reason of his laying some stress on the fact that among the original founders of the academy was Thomas Say, the father of American entomology. In his mention of the services many of the former members of the academy had made to science, he again spoke of Thomas Say, who went out with the Long Expedition to the Rocky Mountains, in 1819. This was followed by expressions of appreciation of the later works of Le Conte, Horn, Cresson and others. He told of the size and importance of some of the special collections, mentioning among others the collection of insects which now numbers 1,000,000 specimens and has world-wide renown.

Doctor Dixon showed the practical use of the work of the academy, and the real value to people and Government in the study of insect life; the now known cause of many preventable diseases, among them yellow fever, an outbreak of which was promptly suppressed in New Orleans, La., and malaria, which have been banished from Cuba and the Panama Canal section. He gave some figures showing the immense damage done to crops by insect life, and showed the money loss in this field, which economic entomology is trying to correct, to be more than \$1,000,000,000 a year.

There were but two papers presented relating exclusively to insects. The first by Henry Skinner, M.D., D.Sc., on "Mimicry in Butterflies."

Dr. Skinner's long familiarity with these insects rendered his paper of unusual interest and value. First calling attention to the many cases of deceptive resemblance among butterflies, and the very much that had been written on protective mimicry, both in this and other countries, he called attention to the fact that actual observations on the feeding of birds on butterflies were almost entirely lacking here in America, so much so that at the present time protective mimicry among butterflies must be admitted to be far more fancied than real, and, that the proof justly demanded by science was here conspicuously lacking. The doctor rested his case on the scientific as well as legal objection of "not proven." The second paper, by Mr. Jas. A. G. Rehn, dealt with "The Orthopterological Inhabitants of the Sonoran Creosote Bush" throughout the country along the Mexican border so rich in new and unique species of insects. It was of much interest not only relative to Orthoptera but also from a faunal point of view.

#### PROF. WEBSTER'S ADDRESS.

Members of the Academy of Natural Sciences of Philadelphia :

A very pleasing duty has devolved upon me as an honorary member of the Entomological Society of Ontario, in having been delegated to

represent that body, at this your 100th anniversary, and to convey, for the Society, its hearty congratulations and good wishes for your continued prosperity and success.

It will perhaps not be out of place for me to call attention at this time to the fact that this sister society, but four years the junior of the Entomological Society of Philadelphia, afterwards the American Entomological Society, expects, next year, to celebrate its 50th anniversary.

We, who have had the good fortune to attend the meetings of this Society across the border, cannot easily forget the cordial greeting and warm comradeship we have always enjoyed, and we all the more appreciate the hearty God-speed which I am expected to convey to you. Not only have our colleagues done a grand work in Canada, but the pages of the CANADIAN ENTOMOLOGIST have been as freely open to us as to their own numbers.

Insects know no national boundaries, therefore those who study them must be equally cosmopolitan in their investigations. So, also, science knows no race, nationality or creed, because it deals with the universal, and in recognition of this, my message becomes all the more appropriate.

F. M. WEBSTER.

#### ON THE LARVAL STAGES OF CERTAIN ARCTIAN SPECIES.

BY WM. BARNES, M.D., AND J. McDUNNOUGH, PH D., DECATUR, ILL.

##### *A. phyllira* Drury.

In a previous article (CAN. ENT., XLIII, 257), we described the final larval stage of this species. Since then we have been successful in breeding from the egg, and append our notes on the various stages. Packard has already described the larval history (Jour. N. Y. Ent. Soc., III, 178), but rather briefly, so that we feel justified in publishing our own account as a verification and amplification of Packard's. It has been suggested that *phyllira* is but a variety of *rectilinea* or vice versa. We would call attention to the fact that in *phyllira* larvæ the spiracles are orange, whilst in *rectilinea*, according to Gibson (CAN. ENT., XXXV, 117), they appear to be black; this would seem to suggest that we are dealing with distinct species. All our bred specimens showed (apart from slight increase or decrease in the heaviness of the white markings), very little tendency to variation, and in no case could we detect a specimen with traces of white markings on the veins in the outer portion of the wing; *phyllira* normally possesses a slight white dash on the subcostal vein and occasionally one on the cubitus near base of wing, as figured by Drury, but beyond this the veins are not outlined with white. The white markings on the veins

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of *rectilinea* on the other hand show apparently a marked tendency to obsolescence, and we possess several Illinois specimens in which we can detect but the merest trace of white on the veins; in fact, were it not for locality, they might easily be mistaken for *phyllira*. Continued breeding will be necessary to decide the question as to whether the above mentioned larval distinction holds good.

In the accompanying sketch we give a diagram of the position of the primary tubercles in the first stage of *phyllira*; this is apparently typical

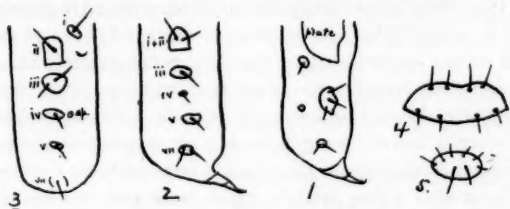


FIG. 7.

1. Prothoracic segment.
2. Mesothoracic segment.
3. Abdominal segment.

4. Prothoracic plate.
5. Small plate.

for the genus *Apantesis*, at least it holds good for all the species that are discussed in this present paper. On the meso- and metathoracic segments tubercles I and II coalesce-forming a single wart with two setae; on the abdominal segments, I and II are separate, the former being minute; III contains two setae, a typical Arctian feature; IV is immediately behind the spiracle, V directly below IV, each one with seta; VI is absent and VII is represented only on those abdominal segments which bear no prolegs as a minute seta; on the thoracic segments VII is a more prominent wart with two setae. On the prothorax and 9th and 10th abdominal segments considerable reduction of the tubercles takes place. In the following descriptions if no reference to the position of the tubercles is made, it may be taken for granted that they correspond with the above diagram.

*Ovum*.—Conical from a flat base; very slightly sculptured; pale yellow, shiny, with no colour change until just previous to emergence when it becomes blackish; deposited promiscuously on the ground.

Stage I.—Head black with sparse setae; body pale greenish brown with blackish tubercles and large black thoracic plate, this latter containing 8 black setae arranged in an anterior and posterior row of four. On the thoracic segments the setae of tubercles I, II and III are black, the others being white; on the abdominal segments I-IX tubercle II contains a

black seta and the dorso-anterior one of III is also black; the remainder are white. On the 9th abdominal segment the whole dorsal portion to each side of the central line is occupied by a large tubercular patch containing three black and one white setæ, the latter situated on the lower posterior portion; below this large patch is a small tubercle with a single white seta. The anal plate is small, oval, and dark in colour, containing two central setæ and a marginal row of six minute white ones on posterior side. Legs blackish; prolegs similar in colour to body. Length, 3 mm.

Stage II.—Head black with numerous short setæ; body greenish, strongly marbled with red-brown, the marbling so arranged as to leave a stripe of the ground colour extending along the body below tubercle II, giving the appearance of a subdorsal line. A series of white patches, more or less evident dorsally, situated between tubercles II. Thoracic plate tends to break up into two anterior mounds and a single transverse posterior one, the former each containing about 7 black setæ, inclined forward over the head, the latter with 4 long straight black setæ and two white ones, arranged three on each side of the central dorsal line. On the prothorax the small tubercle behind the plate contains two white setæ; the large tubercle anterior to the spiracle 6 black setæ and 1 white one, situated anteriorly; the lateral tubercle bears 3 white setæ. On the meso- and metathorax tubercle I and II contains 8-9 black setæ and 1 small anterior white seta inclined forward; tubercle III bears two long black setæ, a small white one on the anterior margin and a similar one on the posterior portion; tubercle IV is small with two white setæ; tubercle V bears 7 setæ, of which on the mesothorax 3 are black and 4 white, on the metathorax 2 black and 5 white, the posterior black one having changed colour; tubercle VII bears 6 white hairs. On the abdominal segments tubercle I is minute, bearing a short white seta, II has a small white seta on anterior margin inclined forward and a long central black seta surrounded by a ring of 5 others; there are usually 2 small white setæ on anterior margin of III and one on posterior portion, and further 5 long black setæ arising out of the central area; tubercles IV and V contain each 4-5 fine white setæ; tubercle VII is small, on leg-bearing segments with three small white hairs, on others with but one or two setæ, absent on 9th abdominal; the large tubercle of this segment bears about 12 black setæ, of which the central one is longest and points backward; further there are about 5 small white hairs around outer margin. The anal plate is small, heart-shaped with about 12 minute hairs, both black and white, situated mostly towards the posterior margin. All black setæ are strongly barbed. Legs black. Length, 6 mm.

Stage III.—Head black with short setæ as in previous stage ; body red-brown with a pale yellow dorsal stripe ; the mounds of the prothoracic plate are more distinctly separate than in previous stage, the anterior ones being kidney-shaped, each bearing 8-10 setæ, the posterior one narrowly oval with about 8 upright barbed bristles ; almost all these setæ are black, an occasional short white one being intermingled. Tubercles shiny, black, prominently conical, tubercle I minute ; tubercle II largest with about 12-15 spiculated black spines, those of the rear segment being longest and inclined backward ; tubercle III with black setæ ; tubercle IV with two central black and about 8 white setæ ; other lateral tubercles entirely with white setæ. Legs black ; prolegs colour of body.

In late stages the body colour appears greenish marbled strongly with red-brown and with central lateral portions of abdominal segments showing traces of orange. Length, 9 mm.

Stage IV.—Head as before ; body dark gray ; marbled with black, and with a pale creamy, usually continuous, dorsal stripe. All tubercles black, shiny, II very large ; lateral tubercles, especially V and VII, shaded prominently around the base with orange. There is considerable increase in the number of setæ, which are mostly prominently barbed. Legs black ; prolegs orange. Length, 12 mm.

Stage V.—Much as in previous stage. Pale yellow dorsal stripe shows a tendency to narrow or disappear intersegmentally ; traces of a broken yellow subdorsal line, composed chiefly of a strip of colour between tubercles II and III. Tubercles I and II black, others either tipped with orange-brown or entirely suffused with this colour. Spiracle orange, prolegs pale reddish. Length, 23 mm.

Stage VI.—Similar to preceding. In freshly moulted specimens all lateral tubercles show very strongly orange, becoming however later more tinged with black ; dorsal stripe prominent ; subdorsal line almost obsolete. Length, 29 mm.

Stage VII.—We would refer to our previous article (CAN. ENT., XLIII, 259) for the description of this, the final stage. All larvæ examined agreed excellently with the description drawn up from the spring brood.

*Apantesis placencia* A. & S.

*Ovum*.—Practically identical with that of *A. phyllira*, deposited promiscuously.

Stage I.—When first emerged pale yellow with black head, turning later dirty brown. Tubercles large, blackish, with long setæ, arranged as in *phyllira* ; setæ of I-III black, of lateral setæ white ; prothoracic plate dark, large, with apparently 6 black setæ. Length, 3 mm.



Stage II.—Head black. Body red-brown with greenish intersegmental tinge; no trace of markings. Tubercles black, I minute with single white seta, II large, with about 5 black setæ, those of the posterior segments being longest and inclined backward, III with 3 or 4 black setæ, IV and V each with 3 small white outwardly inclined setæ. Thoracic plate semilunate, black, with a double row of four setæ. Length, 6 mm.

Stage III.—Head black. Ground colour greenish gray heavily mottled with dark brown and with lateral central portions of segments broadly reddish orange, giving the general appearance of a reddish-orange ground colour, the true ground colour being only apparent intersegmentally and dorsally. A dorsal series of orange diamond-shaped patches, more or less concealed by a thin line of the same colour. These patches are not prominent, being similar in colour to the lateral orange shading; they are most recognizable immediately following the moult, when the lateral colour is not so developed. Tubercles black with considerable increase in the number of setæ. Length, 9 mm.

Stage IV.—Head black. General appearance much darker than in preceding stage. Body gray-green with dark brown marbling; dorsal deep-orange stripe more prominent; lateral orange shading considerably reduced, being confined mostly to the base of the tubercles; these latter shiny black with numerous black setæ, except V and VII which still bear white ones. Spiracle black, prolegs reddish. In late stages the colour becomes paler and the lateral orange markings are again plain. Length, 12.5 mm.

Stage V.—Head and body jet black with large shiny black tubercles which show a great increase in setæ; these are barbed, but not nearly so prominently so as in *phyllira*. A broken dorsal reddish stripe is present. Prolegs reddish; stigma black. Length, 22 mm.

Stage VI.—Scarcely any change from previous stage; rather blacker, dorsal stripe often lacking, when present much broken into spots of reddish orange; tubercles very shiny and large. Length, 30 mm.

Stage VII.—This final stage has already been described by us. (Vide CAN. ENT., XLIII, 259.)

The resultant imagines showed but little variation; in one ♀ there was a slight indication of the W mark due to a few light dots in the sub-terminal area; in most specimens, however, the tendency was to a reduction rather than an increase of the light markings of primaries. The ♀s agreed well with the figure published with the above mentioned article.

(To be continued.)



## ON NORTH AMERICAN PHLÆOTHIRIPIDÆ (THYSANOPTERA), WITH DESCRIPTIONS OF TWO NEW SPECIES.

BY J. DOUGLAS HOOD, U. S. BIOLOGICAL SURVEY.

*Trichothrips anomocerus*, sp. nov.—(Plate VI, figs. 1-4)

*Female*.—Forma brachyptera. Length about 1.5 mm. Colour clear brownish yellow, with conspicuous hypodermal pigmentation in head, thorax and abdomen, which is orange by reflected light and maroon-brown by transmitted light; tube heavily chitinized and darker at middle; segments 7 and 8 of antennæ blackish brown.

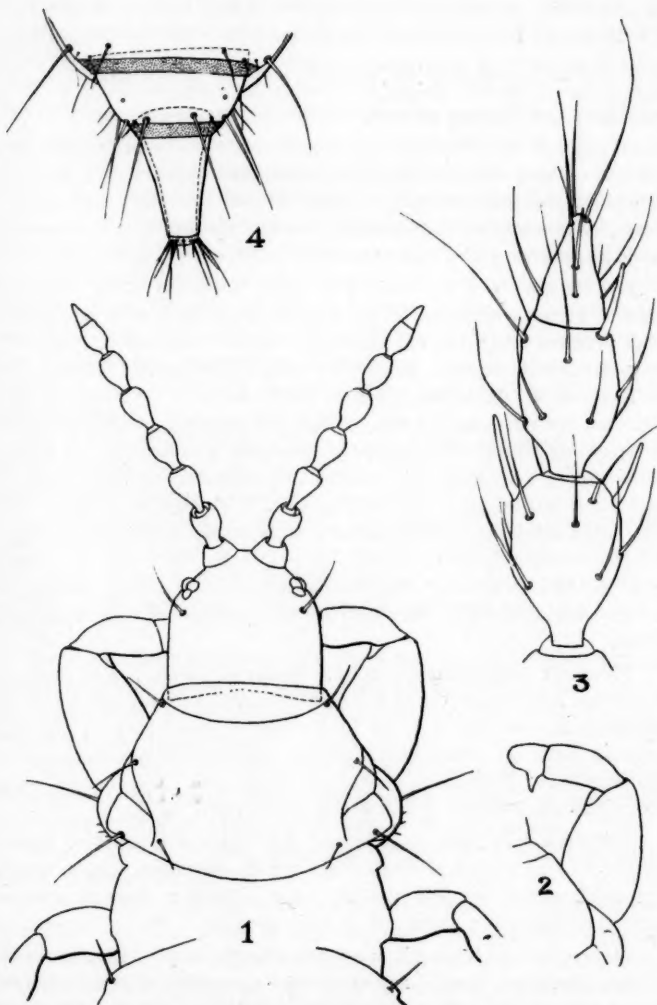
Head distinctly wider than long, blunt anteriorly, frons not at all produced between antennæ, dorsal and lateral surfaces with very minute spines; vertex flat, evenly declivous; genæ subparallel, rounded; postocular bristles pointed, moderately long. Eyes greatly reduced, only one facet visible on lateral profile. Ocelli wanting. Antennæ slightly more than twice as long as head, the last two segments compactly united, the separating suture scarcely visible; segment 3 subconical; 4-6 oval, pedicellate; 7+8 lanceolate, pedicellate; segments 1 and 2 exactly concolorous with body; 3-6 successively very slightly darker; 7+8 rather abruptly dark blackish brown; sense cones moderate in length, slender; formula: 3, 1-1; 4, 1-2; 5, 1-1<sup>1</sup>; 6, 1-1<sup>1</sup>; 7, 0-1; 8 with one at middle of dorsum. Mouth-cone not quite attaining base of prosternum; labium broadly rounded; labrum pointed, scarcely surpassing labium.

Prothorax large, massive, notum weakly chitinized; it is distinctly longer than head (about equal in length to width of head), and across the coxæ is just twice as wide as long; bristles long, pointed; anterior marginals wanting. Pterothorax greatly reduced, narrower and shorter than prothorax. Legs stout, concolorous with body; fore femora short, thick; fore tarsus armed with a strong, acute tooth.

Abdomen large, heavy, about one and one-fourth times as wide as pterothorax; all bristles pointed. Tube thickly chitinized, slightly shorter than head, about two and one-half times as wide at base as at apex; terminal bristles short, about half as long as tube.

Measurements: Length, 1.53 mm.; head, length .18 mm., width .20 mm.; prothorax, length .205 mm., width (inclusive of coxæ) .40 mm.; pterothorax, width .37 mm.; abdomen, width .47 mm.; tube, length .17 mm., width at base .101 mm., at apex .041 mm. Antennæ: Segment

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TRICHOTHRIPS ANOMOCERUS, SP. NOV.

1,  $45\mu$ ; 2,  $56\mu$ ; 3,  $62\mu$ ; 4,  $56\mu$ ; 5,  $59\mu$ ; 6,  $51\mu$ ; 7,  $45\mu$ ; 8,  $33\mu$ ; total, .41 mm.; width at segment 4, .039 mm.

*Male*.—Forma brachyptera. Slightly smaller than female. Length about 1.1 mm. Prothorax very slightly, if any, heavier than in female. Fore femora slightly more swollen; tarsal tooth a little stouter. Abdomen slender, tapering from near the base.

Measurements: Length, 1.09 mm.; head, length .17 mm., width .19 mm.; prothorax, length .192 mm., width (inclusive of coxæ) .37 mm.; pterothorax, width .32 mm.; abdomen, width .38 mm.; tube, length .13 mm., width at base .083 mm., at apex .036 mm. Antennæ: Segment 1,  $45\mu$ ; 2,  $50\mu$ ; 3,  $56\mu$ ; 4,  $49\mu$ ; 5,  $53\mu$ ; 6,  $47\mu$ ; 7,  $43\mu$ ; 8,  $29\mu$ ; total, .37 mm.; width at segment 4, .034 mm.

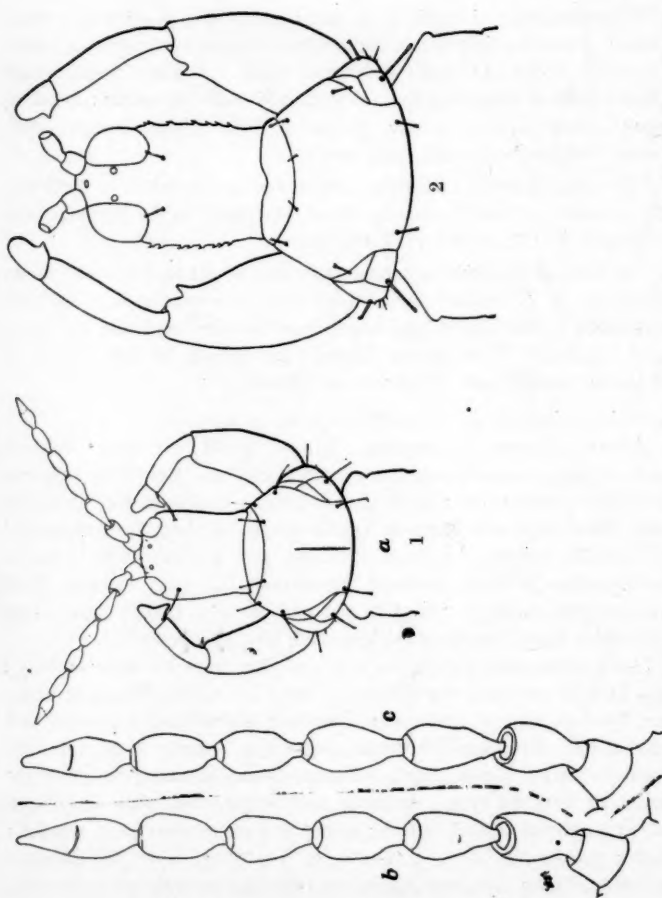
Described from fifteen females and seven males, taken in February under sycamore bark at Plummer's Island, Maryland (in the Potomac near Washington, D. C.), by Mr. W. L. McAtee.

The form of the apical antennal segments seems to ally this species quite closely to *T. ambitus* Hinds, from which, however, it is abundantly distinguished by the shorter tube, shorter and broader head, and the much heavier prothorax. The general facies of the species is thus that of *T. pedicularius* Haliday and *T. americanus* Hood.

*Cryptothrips junctus*, sp. nov.—(Pl. VII, fig. 1, a, b, c.)

*Female*.—Forma brachyptera. Length about 1.7 mm. Surface smooth, shining, anastomosing lines scarcely evident. Colour by reflected light bright crimson red; head and prothorax darkened with blackish brown; tube, legs and antennæ nearly black. Colour by transmitted light blackish brown; the head, prothorax and abdomen with a nearly continuous layer of bright crimson hypodermal pigment; antennæ dark blackish brown, segments 1 and 2 and pedicel of 3 slightly paler; legs slightly paler than antennæ, non-pigmented, tarsi pale yellow.

Head rectangular, about one and one-fifth times as wide as long; cheeks parallel, rounded very abruptly to eyes and slightly flaring at base; vertex rounded, slightly produced; postocular bristles long, explanate and divided at tip. Eyes small, flattened, protruding, anterior in position and directed forward. Ocelli small, subapproximate, anterior, the posterior far removed from the eyes. Antennæ seven-segmented, with an oblique suture at middle of ventral surface; spines and sense-cones long, slender; formula: 3, 1-2; 4, 2-2; 5, 1-1<sup>+</sup>; 6, 1-1<sup>+</sup>; 7, 0-1. Mouth-cone large, heavy, blunt; maxillary palpi more than half the length of pronotum.



CRYPTOTHRIPS JUNCTUS, SP. N.; AND ACANTHOTHIPS NODICORNIS REUT.

Prothorax three-fourths as long as width of head and (inclusive of coxæ) slightly more than twice as wide as long; usual bristles all present, long, dilated and divided at tip. Pterothorax much broader than long, sides subparallel. Legs short, rather slender; fore tarsi armed with a rather long, acute tooth.

Abdomen stout, about one and one-half times as broad as pterothorax; sides subparallel at base, converging roundly from segment 6 to tube. Tube about .6 as long as head, distinctly more than twice as wide at base as at apex, tapering evenly.

Measurements: Length, 1.75 mm.; head, length .30 mm., width .25 mm.; prothorax, length .18 mm., width (inclusive of coxæ) .40 mm.; pterothorax, width .39 mm.; abdomen, width .57 mm.; tube, length .17 mm., width at base .092 mm., at apex .039 mm. Antennal segments: 1, 48 $\mu$ ; 2, 66 $\mu$ ; 3, 66 $\mu$ ; 4, 68 $\mu$ ; 5, 64 $\mu$ ; 6, 64 $\mu$ ; 7, 90 $\mu$ ; total length of antenna, .47 mm.; width at segment 4, .037 mm.

*Female*.—Forma macroptera. Differs from the brachypterous form only in the presence of wings and the consequent increased development of the pterothorax.

Fore wings much broader than hind pair, sparsely fringed, and of equal width throughout; subapical fringe double for five or six hairs; the three subbasal spines knobbed; wings of both pairs uniformly brown in colour.

*Male*.—Forma brachyptera. Differs from the brachypterous female in the somewhat slenderer head with subconcave cheeks, as seen from above, larger prothorax with a thickened median line becoming obsolete before apex and base, stouter and slightly arcuate fore femora, longer and stouter tarsal tooth, and the slenderer abdomen.

Described from twenty females (two of which are macropterous) and eleven males from Baldwin, Michigan, and Mahomet and Murphysboro, Illinois. Specimens were taken April 17, August 16, September 4 and November 7, under bark on white oak, soft maple and sycamore, by Dr. H. E. Ewing, L. M. Smith and the writer.

Type locality: Baldwin, Michigan.

The seven-segmented antennæ, elongate maxillary palpi and the armed tarsus of the female distinguish this species at once from *C. rectangularis* Hood and *C. carbonarius* Hood, the only North American species properly referable to *Cryptothrips*.

During the latter part of August, 1908, I found pupæ of this species in abundance at Baldwin, Michigan, under the loose scales of the bark of

some white oak trees (*Quercus alba*) which stood in a lowland sandy area between two small lakes; and with them was occasionally seen a wingless male or, more rarely, a wingless female. By August 31 adults were plentiful, always wingless, and the males greatly outnumbered the females. September 2 females were abundant, and one of those taken was macropterous. September 4 two males and a second winged female were found to have matured in a vial which contained pupæ taken September 2.

*Acanthothrips nodicornis* Reuter.—(Pl. VII, fig. 2.)

This species has long been known as *Acanthothrips nodicornis*, but Amyot and Serville's *Hoplothrips corticis*, dating from 1843, is probably identical with it. The only North American record of the species is that by Franklin (Psyche, Vol. X, p. 222, 1903), who found a single female under loose bark on a sycamore tree at Amherst, Massachusetts. My specimens, four females and six males, were taken in an open sandy forest about twelve miles from Baldwin, Michigan. One hot summer's day in August many were seen in copulation on the stump of a young poplar, which two weeks before had been cut for tent stakes; but when approached they scampered hastily away or dropped at once to the ground and secreted themselves among the fallen leaves. The few taken are all somewhat larger than European examples, averaging nearly one millimeter longer than several specimens (presumably cotypes) received from Prof. Reuter. The drawing and the following description, based on North American examples, may be of use to students of the group.

*Female*.—Length about 3 mm. Dorsal surface closely subreticulate; ventral surface smooth. Colour by reflected light nearly black; abdominal segments 3–8 marked at base with a pair of latero-dorsal white blotches, about equal in size to the second antennal segment. By transmitted light the colour is dark blackish brown with maroon pigmentation; antennal segments 1 and 2 concolorous with the body, 2 paler at apex; segments 3–5 with base and apex yellow, intermediate portion blackish brown; segments 6–8 slightly lighter than body, the base of segment 6 yellowish; legs concolorous with body, excepting tarsi and extremities of tibiae, which are yellowish brown.

Head one and one-half times as long as wide; sides subparallel, converging slightly to eyes and to base, forming a slight neck-like constriction; dorsal and lateral surfaces sparsely spinose, the lateral spines arising from anterior surface of prominent tubercles, of which about eight are visible on each cheek; postocular bristles short, blunt, inconspicuous, one-third

as long as eyes.\* Eyes large, very finely faceted, one-third as long as head and about as wide as their interval. Ocelli moderate in size; anterior ocellus slightly overhanging the abruptly declivous vertex. Antennæ slender, about one and three-fourth times as long as head; segments 3-6 urn-shaped; 7 and 8 closely united, the latter conical; sense-cones long and slender, scarcely distinguishable from the antennal bristles; formula: 3, 1-2; 4, 1-2<sup>+1</sup>; 5, 1-1<sup>+1</sup>; 6, 1-1<sup>+1</sup>; 7 with one on dorsum near apex.† Mouth-cone pointed, attaining the mesosternum.

Prothorax about .6 as long as head and, inclusive of coxæ, about twice as wide as long; usual spines all present, expanded distally. Pterothorax slightly wider than prothorax; sides nearly straight, slightly converging posteriorly. Wings large, powerful, arcuate, of nearly equal width throughout; fore wings faintly washed at base with brown, and with the three subbasal spines nearly equal in length and blunt; apical fringe double for about thirty hairs; hind wings with a faint vein at costal third reaching about to middle. Fore femora large; subapical tooth acute and directed slightly anteriorly; fore tarsi armed with a broad acute tooth, the anterior margin of which is at right angles to the tarsus.

Abdomen large, broadly rounded at apex; marginal bristles dilated at tip. Tube about .8 as long as head, tapering evenly from base to apex; terminal bristles about as long as tube.

Measurements: Length, 3.2 mm.; head, length .43 mm., width .29 mm.; prothorax, length .27 mm., width (inclusive of coxæ) .56 mm.; pterothorax, width .65 mm.; abdomen, width .69 mm.; tube, length .34 mm., width at base .104 mm., at apex .052 mm. Antennal segments: 1, 48 $\mu$ ; 2, 73 $\mu$ ; 3, 148 $\mu$ ; 4, 129 $\mu$ ; 5, 120 $\mu$ ; 6, 87 $\mu$ ; 7, 75 $\mu$ ; 8, 44 $\mu$ ; total, .73 mm.; width, .042.

*Male*.—Shorter and slenderer than female. Length about 2.6 mm. Fore femora larger, stouter, nearly as wide as head; tarsal tooth larger, slightly curved. Abdomen tapering evenly from about segment 6 to base of tube.

\*Moulton, in his Synopsis, Catalogue and Bibliography of North American Thysanoptera, Tech. Ser., 21, Bur. Ent., U. S. Dept. Agr., states in his key on page 19 that *H. magnafemoralis*, *nodicornis* and *doanei* have no postocular spines. This is incorrect as regards the first two species, at least.

†The formula for the antennal sense-cones is the same as this in both *H. magnafemoralis* Hinds and *H. albivittatus* Hood. In the original description of the latter species, however, their positions are not so described, the three rudimentary cones and the full-developed one on the outer surface of the third segment having been overlooked in the nearly opaque and otherwise unsatisfactory type specimen.



## EXPLANATION OF PLATES VI AND VII.

## Plate VI.

Fig. 1. *Trichothrips anomocerus*, sp. nov.—Female,  $\times 117$ .

Fig. 2. *Trichothrips anomocerus*.—Apex of right antenna of female,  $\times 514$ .

Fig. 3. *Trichothrips anomocerus*.—Tip of abdomen of female; membranous portions stippled;  $\times 117$ .

Fig. 4. *Trichothrips anomocerus*.—Right fore leg of female,  $\times 117$ .

## Plate VII.

Fig. 1. *Cryptothrips junctus*, sp. nov.—a, head and prothorax of  $\delta$ ,  $\times 67$ ; b, left antenna of  $\delta$  from Michigan,  $\times 199$ ; c, left antenna of  $\delta$  from Illinois,  $\times 199$ .

Fig. 2. *Hoplothrips nodicornis*, Reuter;  $\delta$ , head and pronotum;  $\times 67$ .

## LASIOPTERYX MANIHOT, N. SP. (DIPTERA).

BY E. P. FELT, ALBANY, N. Y.

The small, yellowish midges were reared from *Cassava* (*Manihot utilissima*), July 15, 1911, by Mr. W. H. Patterson, of the Agricultural School, St. Vincent, W.I. This species appears to be allied to *L. carpini* Felt, from which it is easily distinguished by the narrow wings. The longer, stouter antennæ in both sexes serves to separate it from a more closely allied undescribed form.

Male.—Length, 1 mm. Antennæ nearly as long as the body, thickly haired, fuscous; 13 segments, the fifth with a stem about  $\frac{1}{2}$  the length of the basal enlargement, which latter has a length  $\frac{1}{2}$  greater than its diameter and bears a thick whorl of long, stout setæ; terminal segment produced, with a length thrice its diameter and tapering to a narrowly rounded apex. Palpi yellowish. Mesonotum fuscous yellowish. Scutellum, postscutellum and abdomen yellowish, the latter sparsely haired. Wings subhyaline, broad, costa dark brown, the membrane rather thickly clothed with linear scales. Halteres yellowish. Coxæ and femora mostly yellowish, the tibiæ slightly darker, the tarsi fuscous yellowish; claws very long, slender, unidentate, the pulvilli rudimentary. Genitalia; basal clasp segment moderately stout; terminal clasp segment long, stout. Other organs indistinct.

Female.—Length, 1 mm. Antennæ extending to the base of the abdomen, rather thickly haired, fuscous yellowish; 13 subsessile segments, the fifth with a length about  $\frac{1}{2}$  greater than its diameter and with a thick whorl of long, stout setæ; terminal segment reduced, narrowly rounded apically. Palpi yellowish, the first segment subquadrate, the second narrowly oval, the third as long as the second, the fourth  $\frac{1}{2}$  longer than the third, somewhat dilated. Abdomen apparently lighter than in the male; ovipositor short, terminal lobes narrowly oval and sparsely setose. Other characters nearly as in the male.

## NOTES ON CUBAN WHITE-FLIES WITH DESCRIPTION OF TWO NEW SPECIES.

BY E. A. BACK, VIRGINIA AGRICULTURAL EXPERIMENT STATION.

From an economic standpoint, there are probably no insects in Florida so detrimental to interests of citrus growers as the citrus white fly (*Aleyrodes citri* Riley and Howard), and the cloudy-winged white-fly (*Aleyrodes nubifera* Berger), which cause an annual estimated loss to the citrus industry of that state of over \$1,125,000.\*

For several years, the writer, with others, was engaged in an investigation of these insects and during that time many reports of white-fly infestations of *Citrus* in Cuba were brought to our attention. Considering the wide spread distribution of the citrus and cloudy-winged white-flies in Florida and the large amount of citrus nursery stock that had been shipped into Cuba from Florida nurseries, it was to be expected that these two species must necessarily have been introduced long ago. As a result of the demand by Florida citrus growers for an examination into the white-fly situation in foreign countries in hopes of discovering a parasite or other enemy that would be of assistance in controlling white-fly pests in Florida, the writer, while still in the employ of the Bureau of Entomology, U. S. Dept. Agric., made an investigation during October and November of 1910 in Cuba and Mexico.

During this search several species of white-flies were collected in Cuba. Heretofore only *Aleyrodes howardi* and *nubifera* have been correctly recorded from Cuba. A more extended collection will, beyond doubt, bring to light many species not listed here, but already recorded from other islands of the West Indies.

It is very generally believed throughout Cuba and Florida that the two great white-fly pests of Florida are present in abundance in Cuba. This is largely due to the fact that all aleyrodids whenever seen, no matter whether on guava or other vegetation, are thought to be the citrus white-fly. As a matter of fact, the citrus white-fly which causes the greatest loss of all white-flies now known has never been found in Cuba, and the cloudy-winged white-fly, next in injuriousness, only in slight numbers. While nine species are here recorded from Cuba, none are at present serious pests because of the work of parasites and fungus diseases.

The Citrus White-fly, *Aleyrodes citri* Riley and Howard.

There is no authentic record of this havoc-working species in Cuba.

\*White-flies Affecting Citrus in Florida, Morrill & Back, Bulletin 92, B. E., U. S. Dept. Agric.

May, 1912

Cook and Horne\* refer to this species as being introduced into Cuba at Santiago de las Vegas on Florida nursery stock.

An examination of material in the Bureau of Entomology, Washington, by Prof. Quaintance, and of material collected by Cook and Horne at the Cuban Experiment Station by the writer, leaves no doubt that *A. nubifera* is the species regarding which they wrote. Frequent reports both in Florida and Cuba of injury caused by this insect to Cuban citrus groves are entirely groundless. In no citrus grove visited from Havana west beyond Bahia Honda, for over 100 miles east of Havana, or in the Isle of Pines in the general vicinity of Santa Fe, was any trace of this pest found. Over three thousand acres of citrus were examined. Mr. W. H. Hoard, of Victoria de las Tunis, who has been thoroughly familiar with this insect in Florida for many years, states that it does not occur, to his knowledge, in Central and Eastern Cuba. Cuban growers of citrus may well feel thankful that this pest has not yet secured a foothold on their island. As this species feeds on coffee almost as greedily as on *Citrus*, as evidenced by examinations made by Dr. E. W. Berger in Florida and by the writer in the Audubon Park greenhouses in New Orleans, the coffee industry of the island would be affected should this pest become abundant. Coffee plants examined by the writer at Seiba Mocha were free from white-fly.

The Cloudy-winged White-fly, *Aleyrodes nubifera* Berger.

This is the species referred to by Cook and Horne (l. c.) erroneously as *citri*. They stated in 1908 that since first seen this species had been decreasing so that at that time it was very difficult to find more than a few healthy specimens in one place. In their opinion the red fungus (*Aschersonia aleyrodidis*) was responsible for this gradual decrease. While the writer examined many orange and grape-fruit trees of all ages in Cuba, even trees in the grove in which it was present in 1908, he was unable to find specimens, but Prof. P. Cardin found orange trees in the Vedado district of Havana badly infested during June, 1911, and sent specimens to the writer. As the red fungus is known in Florida to attack only sparingly this aleyrodid, it is more than probable that other causes have brought about this condition of scarcity, especially the wholesale mortality due to overcrowding as a result of the peculiar habit of the adults of this species to crowd small areas of the tenderest growth with eggs far beyond its capacity to furnish room for the development of the larvæ subsequently

\*Bulletin 9, Estacion Central Agronomica de Cuba, 1908, page 30.

hatching therefrom and the deaths due to what is believed at present, in Florida, to be bacterial in origin.<sup>1</sup>

While the citrus white-fly feeds on a number of plants and trees, the cloudy-winged has been found only on citrus and the rubber tree, *Ficus nitida*. Its discovery on the latter food plant in New Orleans by the writer November, 1910, was such as to indicate its probable origin in India or China. While this species is doubtless still present in Cuba, it cannot be said to be of economic importance at this writing.

The Woolly White-fly, *Aleyrodes howardi* Quaintance.

This species was found quite generally distributed on orange trees wherever these grow in Cuba and Isle of Pines. It is this species which causes the blackening of foliage to which reference is frequently made. It is, however, not a serious pest and cannot be classed in destructiveness with *citri* and *nubifera*. Its spread is most rapid among old orange trees and during the drier seasons. Being a species possessing a thick pupa it is heavily parasitized. It is not only parasitized by the red fungus *Aschersonia aleyrodinis*, as noted by Cook and Horne (l. c.) and by the writer at Seiba Mocha, Guinis, Santiago de las Vegas, and on the Isle of Pines, but is preyed upon by the larvæ of a Tortricid moth. Frequently colonies were found, each pupa of which showed the emergence hole of a hymenopterous parasite or devoured by Tortricid larvæ. The life history of the species and its occurrence in Florida has been treated by the writer.<sup>2</sup>

Besides occurring in Cuba and Isle of Pines, it has been found at Tampa, Ft. Myers and Miama, Florida. It occurs quite generally in the West Indies.

The Paw-paw White-fly, *Aleyrodes variabilis* Quaintance.

This white-fly has previously been reported only from Florida by Quaintance<sup>3</sup> and Back<sup>4</sup> and from Barbadoes by Gowdy.<sup>5</sup> Recently it has been found in abundance at Santiago de las Vegas on paw-paw (*Carica papaya*) by Prof. P. Cardin. It causes a severe blackening of the foliage at times.

1. Natural Control of White-flies Affecting Citrus in Florida, Morrill & Back, Bulletin 102, B. E., U. S. Dept. Agric.

2. The Woolly White-fly: a New Enemy of the Florida Orange, Back, Bulletin 64, pt. 8, B. E., U. S. Dept. Agric.

3. Tech. Bull. No. 8, Div. Ent., U. S. Dept. Agric.

4. Florida Fruit & Produce News, 1910.

5. West Indian Bulletin, Vol. IX, No. 4.

*Aleyrodes floridensis* Quaintance.

This white-fly has been reported by Quaintance (l. c.) from Florida on guava (*Psidium*) and alligator pear (*Persea persea*), and in Barbadoes on both these and smilax (*Theabroma cacao*) by Gowdy (l. c.) It was found by the writer in Cuba only on guava in the Botanical Gardens at Havana. While generally present in Florida wherever the alligator pear is grown, no evidence of injury has ever been known to follow even the heaviest infestations, and it will probably never be a pest in Cuba.

*Aleyrodes mori* Quaintance.

This aleynid with a black pupa case and white wax marginal fringe has been reported only from Florida, where it infests several plants, more especially the mulberry (*Morus*). Discovered by the writer on guava in the Botanical Gardens, Havana, but very scarce.

*Paraleyrodes perseæ* Quaintance.

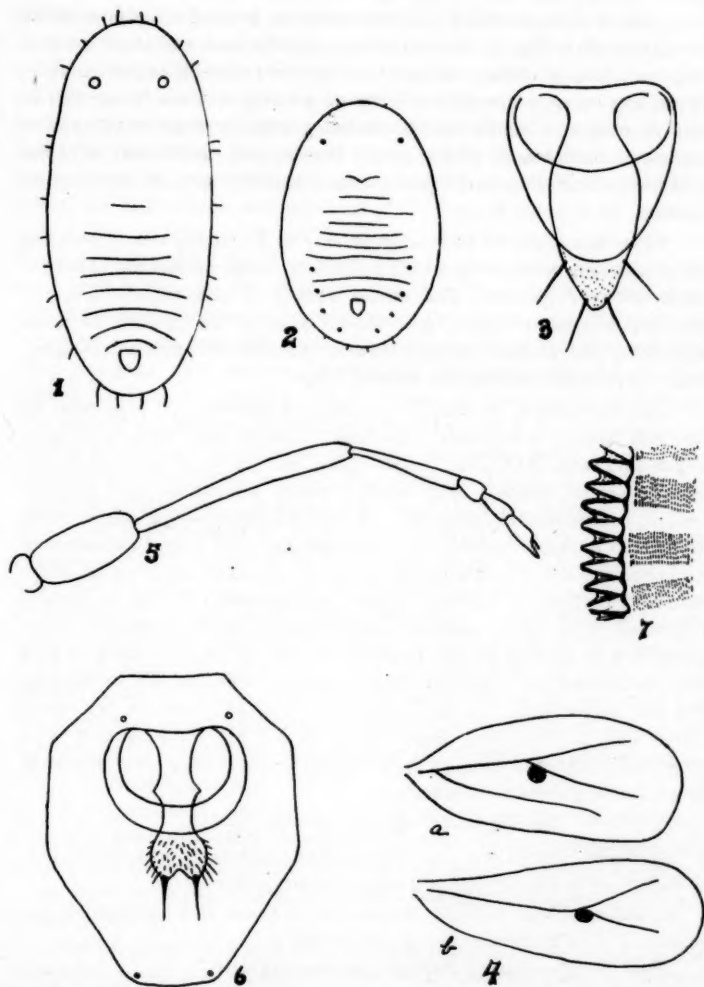
This species, which has previously been reported as infesting *Persea carolinensis*, guava and citrus in Florida, was found on guava at Havana and Santiago de las Vegas in all stages; and while it was not abundant, it was by no means rare.

*Aleurodicus cardini*, n. sp.

*Egg*.—About 0.26 mm. long, width about 0.076 mm. Elongate oval, uniformly pale yellowish, unmarked. Pedicle short; egg lying prone on leaf, often entirely surrounded and concealed by fluffy waxen secretions of the adult. Eggs laid without regard to arrangement on leaf.

*Larva*.—Crawling first instar. (Fig. 1.) Length about 0.319 mm., width about 0.12 mm. Elongate oval, pale yellowish white in colour without darker markings or waxen secretions. Thirteen pairs of marginal spines, short, the posterior two pairs longer; a fourteenth pair located on venter near margin on cephalic end of case. Spine on lower side of distal third of antennæ and terminal spine of antennæ proportionately longer and more distinct than in *A. citri* or *A. nubifera*.

*Pupa Case*.—(Fig. 2.) Length about 0.94 mm., width about 0.64 mm. Subelliptical, elevated on a vertical marginal waxen fringe. Colour yellowish to yellowish white, after emergence empty case whitish, semi-transparent; parasitized specimens appear blackish either throughout or in spots. Margin entire without pattern of any sort; near margin is a series of wax pores. On venter near margin are eighteen or twenty inconspicuous bristles seen only with high magnification; of these, three pair, one cephalic, and two caudad, are more conspicuous. On dorsum nearer the margin than centre are five pairs of round well defined compound



ALEURISCUS CARDINI, SP. N., AND ALEYRODES TRACHOIDES, SP. N.

pores; four pairs on abdominal segments and one pair on cephalic region. Cephalad of vasiform orifice is a pair of minute bristles. Vasiform orifice elongate cordate (Fig. 3), about 0.09 mm. wide at base, and about 0.1 mm. long from base of operculum to tip of lingula; cephalic margin straight, caudal and evenly rounded. Operculum subelliptical nearly one-half as long as orifice. Lingula broad, extending well beyond caudal end of orifice, on distal fourth which usually lies beyond caudal end of orifice with two pairs of comparatively long setae. Rudimentary legs and antennae as usual.

From wax pores on dorsum, there may be frequently seen protruding white glistening waxen rods which frequently break off and fall about the pupae as in *P. perseæ*. The dorsal surface of case usually becomes, especially towards maturity, well dusted with a thin coating of white secretions, and at times a very narrow, downwardly directed marginal fringe may be seen outside the vertical fringe.

*Adult*.—Length, ♂, about 1.16 mm. Forewing, ♀, 1.39 mm. by 0.62 mm.; length *hind femur*, 0.26 mm. Length hind tibia, 0.35 mm.; length hind tarsi, 0.18 mm.; length claws, 0.08 mm.; ♀ proportionately larger. Yellow, covered with whitish waxen secretions; eyes red, not divided, but distinctly constricted. A line extending along side of head, interrupted by upper portion of compound eye, the lateral callosities of prothorax, indistinct traces along suture of proximal segments of abdomen, and portions of vasiform orifice, all blackish. Wings beautifully iridescent, with deep violet reflections, a small prominent round brownish spot about 0.06 mm. in diameter (Fig. 4) on each fore and hind wing just behind the posterior distal branch of vein, usually enveloping vein but never filling the angle between veins as shown in *A. mimos* (Tech. Bull. 8, Div. Ent., Dept. Agric., Pl. VI, Fig. 6), wings otherwise unmarked. Antennae (Fig. 5) seven jointed, the comparative lengths of the various segments as follows:

$$\text{Segments } \frac{1}{20}, \frac{2}{9}, \frac{3}{137}, \frac{4}{8}, \frac{5}{1.5}, \frac{6}{2.5}, \frac{7}{2.1}$$

Segments 3 to 7 show usual corrugations; segment 7 with constriction on distal half at which point is borne a distinct bristle.

*Habitat*.—Type material collected at Havana and Santiago de las Vegas, Cuba, in November, 1910, by the writer.

*Food Plant*.—Guava, *Psidium guajava radii*.

*Type*.—Type material in collection of the U. S. D. A., Bureau of Entomology, and in that of the writer.



This species is really distinguished by its iridescent wing on which the spots described stand out prominently. It differs superficially from *iridescens* in having a spot on the hind wings and in colour of pupa case; from *minima* it differs in having no appreciable clouding of wings other than the spots described, in shape and location of the spots, and in the pupa case having but five instead of seven pairs of wax pores. The darkened portions of the vasiform orifice appear as a dark spot on the untreated adult. In crawling about the leaf, the female leaves behind a line of fine fluffy waxen secretion rubbed from a tuft of the same developing on the under side of her abdomen. Frequently her path can be distinctly followed by the aid of these lines of secretions. In mating, the sexes head in the opposite direction, and in this respect differ from those species of *Aleyrodes* that have come under the observation of the writer.

This species becomes quite abundant on the Guava at times, and when not parasitized becomes a nuisance. In November, 1910, it was causing noticeable blackening of the foliage at Santiago de las Vegas. The species is, however, heavily parasitized by a hymenopterous parasite and the red fungus (*Aschersonia aleyrodinis*) which the writer found generally present on affected leaves. Prof. Patricio Cardin, for whom this species is named, sent the writer specimens in May, 1911, over 90% of which had been parasitized by a hymenopterous parasite. This is the species of White-fly figured by Cook and Horne as an undetermined aleyrodid on guava (Pl. XV, fig. 41, Bull. 9, Estacion Central Agronomica de Cuba), and beyond doubt is that referred to in the Primer Informe Annual of the same station as "Guagua a mosca blanca de la guayabo." Cook and Horne (l.c., p. 31), say that *Aleyrodes howardi* is the species referred to, but in this they are apparently mistaken, as the writer has not found *howardi* except very rarely on guava. While *howardi* was generally present on orange trees close by, this species was found only on guava.

*Aleyrodes trachoides*, n. sp.

*Egg*.—About 0.2 mm. long. Pale in colour, smooth, without reticulations or waxy secretions; curved with convex side approximating leaf, attached by short stalk arising from convex surface, about one-fourth distance from base to tip of egg. Eggs deposited promiscuously about lower surface of leaf.

*Larva, crawling first instar*.—Length about 0.27 mm., width about 0.14 mm.; elongate elliptical, yellowish white, with nine pairs of marginal bristles and one pair cephalad on venter near margin; the anterior and two posterior pairs of marginal bristles longest.

*Pupa case.*—Length about 0.83 mm., width about 0.5 mm. Sub-elliptical in shape, many specimens with more or less evident indentures on cephalo-lateral margin of case. Black, with whitish mealy waxen secretion on dorsum, not abundant enough to entirely obscure colour of case; case with conspicuous lateral waxen fringe of a cottony nature, averaging about one-half in length the width of the case. Along the dorsimeso is a distinct elevation extending cephalad from and including the vasiform orifice to near the margin of the case, reduced to a mere ridge on thoracic region, but broader and evenly rounded on the abdominal region, and merging caudad into a more or less octagonal rim around the vasiform orifice. (Fig. 6.) Abdominal segments distinct, extending outward, but slightly beyond the rounded keel. Dorsum with three pairs of stout bristles; one on the mesothorax, one just cephalad of orifice and one at posterior end of keel. Two pairs of minute marginal bristles present; one cephalad, and one caudad. Marginal rim distinct, with colourless wax tubes distinct; wax tubes elongate, more or less rounded, some acute, incisions obtuse or acute. Between margin of case and line marking outer limits of pupa within is a series of dark elongate strictions parallel to case margin. (Fig. 7). Vasiform orifice (Fig. 8), sub-semicircular, distinctly broader than long; operculum sub-semicircular, broader than long, reaching about  $\frac{2}{3}$  distance from base to tip of orifice. Lingula fully developed, reaching well beyond the caudal margin of orifice, consisting of a basal shaft and expanded tip; shaft acutely enlarged midway; tip nearly circular, with distinct constriction distally and armed distally with a pair of comparatively long weak bristles and numerous short hairs. Lingula seen with great difficulty, except in case pupal skins protruding from pupa case.

*Adult.*—Female dried specimen, about 0.8 mm. long, fore wing about 0.96 mm. long, posterior femur 0.2 mm. long, posterior tibia 0.3 mm. long, posterior tarsi 0.1 mm. long. Adults yellowish, without darker markings, after emergence becoming thoroughly coated with whitish secretions, eyes reddish, constricted at middle, but not divided; wings with typical *Aleyrodes* venation, whitish, without spots or clouds, slightly violet. Males do not differ from females except in usual characteristics.

*Habitat.*—Type material collected at Santiago de las Vegas, Cuba.

*Food Plant.*—Indigenous solanaceous vine, *Solanum seaphorthianum* Andr. (Dr. Cauzarez authority.)

*Type.*—Type material in collection of U. S. D. A., Bureau of Entomology, and in that of the writer.

This species is closely related to *Aleyrodes tracheifer* Quaintance, and runs to this species in the key (Technical Series, No. 8, Div. of Ent., U. S. Dept. Agric.). It differs, however, in that the wax marginal fringe is not as wide, that the marginal wax pores are more even, in the shape of the rim about the vasiform orifice, and in the development of the keel on the dorsum. In *tracheifer* this keel is narrow and of even width throughout, except for certain constrictions which produce an "arrow-shaped" effect anteriorly. In *trachoides* this keel is a mere ridge on the thoracic region, but very much broader on the abdominal regions. The lingula of *tracheifer* is very small and poorly developed as compared with that of *trachoides*.

Described from an abundance of material collected by Prof. P. Cardin, who states, that although extremely abundant (quite coating the under surfaces of leaves affected), no sooty mold (*Meliola*) follows its attack. Prof. Cardin is also authority for the statement that when abundant this species causes the foliage to fall.

#### EXPLANATION OF PLATE VIII.

- Fig. 1. *Aleuriscus cardini*.—Crawling young, dorsal view.  
Fig. 2. *A. cardini*.—Pupa case, dorsal view.  
Fig. 3. *A. cardini*.—Vasiform orifice.  
Fig. 4. *A. cardini*.—*a*, fore wing; *b*, hind wing.  
Fig. 5. *A. cardini*.—Antenna.  
Fig. 6. *Aleyrodes trachoides*.—Vasiform orifice and rim about same, circles showing location of 7 spines.  
Fig. 7. *Aleyrodes trachoides*.—Margin of pupa case, enlarged.

#### APHID NOTES FROM OREGON.

BY H. F. WILSON, CORVALLIS, OR.

In a general study of the plant lice of Oregon, we have found abundant material in many old and some new species. We are making an effort to clear up the life history of a number of them and the present paper is the first of a series which we hope to get out, giving all stages of as many species as possible.

##### *Illinoia osmaroniae*, n. sp.

This quite large aphid is found on the leaves of *Osmaronia cerasiformis* and is quite abundant about Corvallis, Oregon.

May, 1912

*Stem-mother*.—On March 18, 1911, the stem-mothers of this species, with newly-born young, were plentiful in the just opening leaf buds of the host plant.

General colour light green throughout with legs and antennæ slightly paler green. Body large and robust. Antennæ about two-thirds the length of body and quite slender. Nectaries quite slender and about one-fourth as long as the body. Cauda short and triangular in shape.

Measurements: Length of body, 3.33 mm.; width, 1.8 mm. Length of antennal segments, I, 0.135; II, 0.04; III, 0.7; IV, .33; V, .38; VI, .2; spur, .51 mm.; total length, 2.295 mm. Length of nectaries, .73 mm. Length of cauda, 0.22 mm.

*Spring Migrant*.—April 25th; what is probably the third generation of this species found abundantly on under side of leaves; numerous young present.

General colour light green; head and thorax orange; antennæ with six segments; spur of sixth as long or longer than third segment; sixth segment and spur dusky and basal two-thirds of third segment also dusky; legs light green except distal end of tibia and tarsi, which are nearly black. Wings hyaline and large. Nectaries long and cylindrical, slightly constricted at tip. Cauda large, slightly turned up and blunt at point. Third antennal segment with from 24 to 28 small, irregularly-placed sensoria, most of them scattering. Antennal tubercles large and distinct, and strongly gibbous; at upper inner edge two bristle-like hairs at highest part. First segment large and strongly gibbous; second segment small in comparison.

Measurements: Length of body, 2.88 mm.; width, 1.22 mm. Length of antennal segments, I, .176; II, .09; III, 1.11; IV, .84; V, .75; VI, .26; spur, 1.11 mm.; total length, 4.336 mm. Length of wing, 5.7 mm.; total expanse, 12.4 mm. Length of nectaries, 1 mm. Length of cauda, .44 mm.

*Fall Migrant*.—Oct. 11; winged individuals not very common and producing young on leaves of *Osmoronia* about Corvallis.

General colour green with head and thorax orange coloured. This form resembles the previous form entirely, except in the antennæ and size, the fall migrant being slightly smaller, and the third segment of the antennæ bears from 18 to 22 regularly placed round sensoria lying in a straight line along the outer edge.

*Oviparous Female*.—The egg-laying female is orange-green in colour, and is quite small in comparison with the stem-mother. The legs are a

little lighter in colour than the rest of the body and the antennæ are slightly dusky at tip. Antennæ longer than the body and placed on large tubercles.

Measurements: Length of body, 2.33 mm.; width, 1 mm. Length of antennal segments, I, .11; II, .066; III, .4; IV, .33; V, .38; VI, .154; spur, .82 mm.; total length, 2.26 mm. Length of nectaries, .73 mm. Length of cauda, .33 mm.

*Egg*.—The eggs are deposited on the shoots at the base and on the under side of the buds. No measurements of the eggs were secured. They are very similar to other species in this group, although smaller than one would expect for the size of the insect. When first deposited they are light greenish yellow and later become deep shining black.

*Alate Male*.—Collected on underside of leaves November 3rd, 1911. General colour light yellow. Head, thorax, legs and antennæ dusky to black. Two basal segments of antennæ and basal half of femora yellow. Abdomen with six transversal bands broken in half, four in front of base of nectaries and two behind. Cauda of medium length, tapering and blunt at the tip. Antennal tubercles large and very distinct, being slightly gibbous on upper inner edge; first antennal segment large and strongly gibbous on inner side, second segment quite small in comparison. The third, fourth and fifth antennal segments with an irregular row of small widely separated circular sensoria on each segment. They vary from 18 to 26 on each segment.

Measurements: Length of body, 2.66 mm.; width, .9 mm. Length of antennal segments, I, .135; II, .066; III, 1.02; IV, .8; V, .8; VI, .198; spur, 1.29 mm.; total length, 4.299 mm. Length of wing, 5.95 mm. Total wing expanse, 12.85 mm. Length of nectaries, 7 mm. Length of cauda, 3 mm. The penis of this form is easily forced out by a little pressure on the abdomen.

*Illinoia macrosiphum*, n. sp.

First collected about Corvallis, Oregon, on *Amelanchier alnifolia*, July 4, 1911. Found in small colonies and not very plentiful. General colour whitish yellow. The specific name *macrosiphum* is applied on account of the extremely long nectaries. In the very young these are as long as the body, in the mature specimens they are  $\frac{1}{2}$  to  $\frac{2}{3}$  the length of the body. An effort was made to secure the winged forms of this species, but none were found excepting the alate male of what is supposed to be the same species collected on rose November 3, 1911, and on *Amelanchier*

bushes the last of September. These last specimens measure in length, from forehead to tip of cauda, 2 mm., while the nectaries measure from base to tip 1.78 mm. Antennæ reaching to tip of nectaries. Comparative lengths of segments can be obtained from measurements. Antennæ except basal segment slender, basal segment very large in proportion to the others. Legs quite long, nectaries large at base and tapering, each long and ensiform.

Measurements: Length of body from forehead to base of cauda, 2 mm.; width, .85 mm. Length of antennal segments, I, .176; II, .09; III, .82; IV, .622; V, .644; VI, .176; spur, 1.29 mm.; total length, 2.818 mm. Length of nectaries, 1.622 mm. Length of cauda, .33 mm.

*Oviparous female* resembles the viviparous female, except in the colour of the body, which is rosy red.

*Alate Male*.—What we supposed to be the males of this species were collected on wild rose bushes under *Amelanchier alnifolia*.

General colour green with rosy tint; five transverse bands may be found on the abdomen. These are broken so as to appear like ten spots. Head and thorax dusky. Antennæ except first two segments dusky. Legs with dusky joints and tarsi. Nectaries dusky, cauda rosy coloured. Third segment with numerous small sensoria; fourth with about thirty; fifth with about twenty. A very interesting character of this species is found in three small sensoria on the sixth segment besides those at the base of the spur. One of these may be found at each end of the segment and the third lies midway between.

Measurements: Length of body from forehead to base of cauda, 1.066 mm.; width, .52 mm. Length of wing, 2.71 mm.; width, 1 mm.; total wing expansion, 5.93 mm. Length of antennal segments, I, .11; II, .045; III, .6; IV, .49; V, .58; VI, .135; spur, 1.174 mm.; total length, 2.134 mm. Length of nectaries, .75 mm. Length of cauda, .198 mm.

*Myzus rhamni* Boyer.

Syn. *Macrosiphum rhamni* Clarke.

This species is very abundant about Corvallis on *Rhamnus purshiana*. The entire development is apparently passed on this plant as they were present throughout the year. I have not seen specimens of Clarke's *Macrosiphum rhamni* and repeated efforts to locate the types, if there are any, were unsuccessful. From the description I am led to believe that the California species is the same as the one found in Oregon, and there

seems little doubt but that the Oregon species is the same as the one described by Boyer.

*Stem-mother*.—The first stem-mothers were collected on the 23rd of March and at that time they were about full grown.

General colour light green. Antennæ towards tips dusky; distal end of tibiæ and tarsi dusky. In this stage the characters resemble those of *Aphis* more than anything else. The antennæ are stout and measure less than one-half the length of the body. The legs are short and the antennæ and cauda are as in *Aphis*. Antennal tubercles distinct, but not long.

Measurements: Length of body from forehead to tip of cauda, 2.65 mm.; width, 1.30 mm. Length of antennal segments, I, .154; II, .066; III, .33; IV, .242; V, .27; VI, .11; spur, .44 mm.; total length, 1.612 mm. Length of nectaries, .5 mm. Length of cauda, .176 mm.

*Viviparous apterous female* of the summer generations collected June 4th, 1911, on underside of leaves of tree on college campus; pupa and alate forms also present.

General colour light green or lemon-yellow throughout, but the characters are like those of *Myzus*, and this form is quite distinct from the stem-mothers. The antennæ are quite long and slender and placed on prominent tubercles. First antennal segment strongly gibbous on inner side. Sixth antennal segment and spur almost setaceous in form. For comparative lengths see measurements. Legs rather stout, short and sparsely hairy. Nectaries thick at the base and slightly tapering with a slight inward curve. Cauda medium in length and blunt at the tip.

Measurements: Length of body, 2.5 mm.; width, 1 mm. Length of antennal segments, I, .135; II, .09; III, .778; IV, .55; V, .51; VI, .154; spur, .98 mm.; total length, 3.197 mm. Length of nectaries, .778 mm. Length of cauda, .154 mm.

*Spring Migrant*.—Collected on underside of leaves June 4th, 1911.

General colour lemon-yellow. Head and thoracic shield light orange. First two antennal segments green, the base of the third green, remainder of antennæ dusky to black. Basal half of nectaries green to dusky, outer half darker to black. Some specimens with an orange spot in the centre of the body just back of the thorax. Antennæ long and slender and placed on prominent tubercles. First segment large and strongly gibbous on the under side. Second segment small. Third segment with about twenty-five nearly circular sensoria of variable sizes and irregularly placed. Frontal tubercle of head quite prominent. Legs long and slender.



Nectaries long, slender and slightly curved in at middle. Cauda of medium length, bluntly pointed.

Measurements: Length of body, 2.48 mm.; width, .95 mm. Total wing expanse, 8 mm.; length of wing, 3.8 mm. Length of antennal segments, I, .15; II, .1; III, .85; IV, .56; V, .55; VI, .2; spur, 1.1 mm.; total length of antennæ, 2.51 mm. Nectaries, .78 mm., and cauda, .15 mm.

*Fall Migrant.*—This form so nearly resembles the above as to make a second description unnecessary.

*Oviparous Females.*—Taken on leaves and in the act of oviposition along young shoots, November 1, 1911; present until a late frost in November.

General colour green. First two antennal segments and basal half of third and legs, except tarsi, light green, remaining parts of antennæ and tarsi dusky to black. Other characters and measurements taken from specimens mounted in balsam. Antennal tubercles strong and prominent. First antennal segment large, remaining segments long and slender. Antennæ medium length and with decided *Myzus* characters, being slightly curved in and having the constricted tips. The portion of the abdomen back of the nectaries large and extending back nearly to the end of the nectaries. Cauda short and blunt.

Measurements: Length of body, 2.25 mm.; width, 1 mm. Length of antennal segments, I, .135; II, .066; III, .58; IV, .49; V, .4; VI, .11; spur, .55 mm.; total length, 2.331 mm. Length of nectaries, .71 mm.; length of cauda, .11 mm.

*Alate Male.*—Collected with oviparous females and alate viviparous females on underside of leaves, Nov. 1st and 3rd, 1911.

General colour green. Antennæ with first two segments and base of third light green; remaining segments, with distal half of femora and tarsi, dusky, other parts of less green. Nectaries light dusky at base, shading into black at tip. Antennæ on prominent tubercles and with first segment large and gibbous. Third and fourth segments with numerous slightly-raised sensoria, fifth with about eight slightly larger sensoria on outer edge and in a row. Wings large and venation regular. Legs long, femora stouter than in alate females. Nectaries shorter than in females, but with *Myzus* characters. Cauda of medium length, not tapering and quite blunt at the tip.

Measurements: Taken from specimens preserved in balsam. Length

of body, 1.174 mm.; width, .4 mm. Length of wing, 2.15 mm.; total wing expansion, 4.60 mm. Length of antennal segments, I, .066; II, .047; III, .44; IV, .34; V, .33; VI, .09; spur, .622 mm.; total length, 1.935 mm. Length of nectaries, .242 mm. Cauda, .11 mm.

Eggs deposited on young twigs about base of buds.

(To be continued.)

#### NOTES ON SOME NORTH AMERICAN TINEINA.

BY ANNETTE F. BRAUN, UNIVERSITY OF CINCINNATI.

*Argyresthia annettella* Busck.

*Argyresthia annettella* Busck, Proc. U. S. Nat. Mus., XXXII, 12, 1907.

The larvæ of this species mine the leaves near the tips of the twigs of the Juniper (*Juniperus communis* L.). The leaf, except at its extreme tip, is reduced to a mere shell, containing a few scattered grains of excrement, as may be seen by holding the twig toward the light. In this manner each larva excavates about four leaves, passing from one to another through the stem. The mines are started in summer, and the larvæ winter within the mines, leaving them to pupate in May. The mined leaves later become discoloured, and ultimately the entire end of the twig dies. Where the miners are abundant, the numerous brownish dead ends of the twigs give evidence of their presence. The cocoon, which is an open meshwork of coarse silk, is attached to the upper side of a leaf near the mine. The imagoes appear during the early part of June.

Although the Juniper is widely distributed around Cincinnati, *A. annettella* seems to occur only in three or four isolated spots, where I have seen as many as 40 or 50 mines upon a single plant about five feet high.

*Lithocolletis trinitella* Braun.

*Lithocolletis trinitella* Braun, Ent. News, XIX, 99, 1908; Trans. Am. Ent. Soc., XXXIV, 279, 1908.

Since the original description of this species was published, I have been successful in rearing four specimens from small tent mines on the under side of leaves of Silver Maple (*Acer saccharinum* L.), collected in Clermont Co., Ohio. The mines are extremely small, about 8 mm. long, and much wrinkled at maturity. The pupa is enclosed in a loose web of silk.

The moths, while agreeing in all essential particulars with the types, are somewhat larger, and have a third costal white streak, which is often obscure and entirely unmarginated.

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*Lithocolletis martiella* Braun.

*Lithocolletis martiella* Braun, Trans. Am. Ent. Soc., XXXIV., 290, 1908.

A single specimen of this species, bred from *Betula lenta* L., at Balsam, N. C., July, 1911, confirms Dr. Dyar's somewhat doubtful record of its food-plant as birch, and gives two widely-separated localities for the species, the type locality being Kaslo, B. C.

The mine, which is placed on the lower surface of the leaf, is elongated, and the loosened epidermis is thrown into a series of fine ridges. The pupa is not enveloped in a cocoon, but the one-half of the mine containing the pupa is sparingly lined with silk.

*Lithocolletis betulivora* Walsingham.

*Lithocolletis betulivora* Walsingham, Ins. Life., III, 326, 1891; Braun, Trans. Am. Ent., XXXIV, 339, 1908; Dyar, List N. A. Lep., No. 6328, 1902.

A single specimen of this species was bred from *Betula lutea* Mich., at Balsam, N. C. The pale markings are suffused with yellowish to such an extent that they are scarcely differentiated from the ground colour of the wing, and dark scales are entirely lacking, except external to the pair of spots at the apical third and in the apex of the wing.

*Coriscium cuculipennellum* Hübner.

*Coriscium cuculipennellum* Hübner, Ges. eur. Schmett., VIII, Tin., VI, Al. B. f. 2, 1831; Fernald, CAN. ENT., XXV, 96, 1893; Dyar, List N. A. Lep., No. 6401, 1902.

I have found the mines of this species common in the vicinity of Oxford, Ohio, upon the leaves of Green Ash (*Fraxinus lanceolata* Borck.) and White Ash (*Fraxinus americana* L.). The mine, at first very narrow and shining white, begins on the upper side near the midrib, usually following the midrib downward more or less closely for a length of 3-4 cm., thence diverging and slanting outward to the margin of the leaf, where it is scarcely more than .5 mm. wide. Here it enlarges into an elongate white blotch 2-2.5 cm. long and 5 mm. wide. The epidermis in this blotch becomes so much wrinkled that the edge of the leaf is bent over, entirely concealing the mine, except at the extreme ends. The loosened epidermis is everywhere very thin.

The larva later feeds within conically-rolled leaves, and spins the characteristic suspended cocoon within the roll.

*Lyonetia latistrigella* Walsingham.

*Lyonetia latistrigella* Walsingham, Trans. Am. Ent. Soc., X, 203, 1882; Busck, Proc. Ent. Soc. Wash., V, 209, 1903; Dyar, List N. A. Lep., No. 6416, 1902.

Two specimens of this interesting species were bred at Balsam, N. C., from mines on *Rhododendron maximum* L. The mines were only observed upon the young tender leaves which had not yet attained their full size. The mine begins as a very fine black line, continuing thus for a length of about 3 cm., after which it becomes noticeably broader for about the same distance, but is still to be considered a linear mine. Beyond this point it rapidly enlarges to a brownish elongate blotch, 4 cm. in length or more, with an average width of 5 mm. The larva leaves the mine to pupate, suspending its naked chrysalis by means of a few silken threads stretched across a bent leaf.

The two imagoes agree closely with Walsingham's description, and exhibit no variation. They are easily distinguished from the allied species by the conspicuous ferruginous patch of scales in the apical fourth of the wing.

## TWO NEW SPECIES OF COLEOPTERA FROM ILLINOIS.

BY A. B. WOLCOTT, CHICAGO, ILL.

The two apparently new species herewith described were collected by Prof. Arthur G. Vestal during the course of his biological studies in the Illinois sand region, and, as the result of his investigation will, no doubt, soon be published, it seems desirable that these nondescripts be made known prior to the appearance of his paper.

For the opportunity of describing these beetles I am indebted to Prof. Vestal, who, with rare generosity, likewise gave me the two unique representatives of the following species.

*Saprinus illinoensis*, sp. nov.

Broadly oblong-oval, strongly convex, shining black; the antennæ dull rufous, the basal joint and the legs rufo-piceous. Head impunctate, strongly margined at sides and apex; surface with a distinct and irregularly eroded chevron. Prothorax twice as wide as long; the sides rather strongly convergent and feebly rounded, more strongly rounded near apex; marginal groove distinct, deep throughout; disk feebly, rather densely rugulose, more feebly so toward middle and obsolete in small area at middle of base, coarsely and deeply but sparsely punctate along the

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base. Elytra rounded at the sides, three-fourths longer than the prothorax, and at basal third distinctly wider, finely and not very densely punctate at apex, punctate space extending narrowly along the suture to the middle and not entered by the dorsal striæ; each elytron with a vague impression at middle near sutural striæ; margined stria straight, deep, fine along the apex to suture; outer subhumeral fine, distinctly diverging from the marginal to the middle thence converging and extending very nearly to apex; inner subhumeral distinct from the middle to apical sixth, fragmentary and feeble before the middle; oblique humeral fine and feebly impressed, extending to basal third, not joining the internal subhumeral; dorsal striæ rather fine, broadly arcuate, the first extending to apical fourth, second and fourth to apical third, the third slightly shorter, one to three hooked at base, the fourth broadly arched at base, joining the entire sutural. Propygidium short, sub-impunctate in basal half, the punctures apically rather coarse and dense, but feeble, subcarinate at middle. Pygidium not densely but rather coarsely, feebly punctate. Prosternal striæ abbreviated at apical fourth, rapidly divergent posteriorly; lateral convergent carinæ very distinct; transverse suture punctate. Mesosternum feebly emarginate at apex, coarsely, remotely punctate. Metasternum with a distinctly limited transverse band of coarse, sparse punctures posteriorly. Anterior tibiæ with five subacute erect teeth, the outer three longer and broader.

Length, 4.5 mm.

One specimen, Havana, Ill. "Under a board at the Devil's Hole, July 29, 1910."

This species would by Dr. Horn's table fall with *sphaeroides* J. E. Lec. In size and colour, however, it is nearest the recently described *lakensis* Blatch. It agrees with both these species in having the sutural striæ entire and the dorsals not entering the punctured space. *Illinoensis* may be distinguished by the very distinct chevron of the head, the irregular dorsal striæ, the manner and extent of punctuation of the prothorax and elytra and its somewhat larger size.

*Bruchus arenarius*, sp. nov.

Form very robust, black, densely evenly cinereo-pubescent.\* Head subopaque, finely densely subrugosely punctate; front feebly subcarinate. Antennæ as long as half the body, not conspicuously incrassate externally; second joint slightly longer than wide; black, basal joint red beneath.

\*Under a rather high power glass, sparse, evenly distributed, yellowish hairs are discernable; these are not numerous enough, however, to alter the general grayish tone of the pubescence.

Thorax more than twice as wide at base as long; sides strongly arcuate; disk moderately convex; basal lobe broadly rounded; finely densely feebly punctate. Scutellum small, broader than long, punctured and cinereo-pubescent. Elytra subquadrate, conjointly at middle as broad as long; sides distinctly arcuate; disk flattened, finely striate; striæ finely and feebly punctate; intervals broad, flat, finely rugosely punctate, each with a series of distant large punctures. Pygidium oblique basally, convex and vertical in apical half; the tip somewhat inflexed; rather coarsely, sparsely and feebly punctate, uniformly cinereo-pubescent. Hind femora mutic. Apical spur of hind tibiæ about one-third the length of the first tarsal joint.

Length, 2.25 mm.

One specimen, Havana, Ill. "On the sand, between tufts of bunch-grass at the Devil's Hole, April 9, 1911."

This species belongs to group IV of Prof. Fall's table, where it would seem to be placed best immediately after *leucosomus* Sharp. The small size of this species, in connection with its entirely black colour, uniform, not variegated pubescence and absence of spots of pygidium, renders it easily recognizable.

*BASILARCHIA WEIDERMEYERII ANGUSTIFASCIA*,  
A NEW GEOGRAPHICAL RACE.

BY WM. BARNES, M.D., AND J. MCDUNNOUGH, PH D., DECATUR, ILL.

A series of 2 ♂s and 5 ♀s, collected last summer in the White Mts., Arizona, differs from the typical form from Colorado and Utah, as depicted by Edwards (Vol. I, pl. 42), in that the median white band is much reduced in width, and the intersecting veins, especially on the primaries, are more broadly black. This difference is most noticeable in the ♀s, the band on the primaries being distinctly broken up into an irregular row of white semiquadrate spots, of which the third from the costa is greatly reduced in size; on the secondaries the spots are *not* broader than long. As this feature is remarkably constant in all the specimens before us, and as, furthermore, we have had for years a ♀ labelled Arizona in the collection which shows the same peculiarities, we consider a varietal name for the Arizona form warranted; the extreme form of this race, in which the white band has entirely disappeared, is the ab. *sinefascia* Edw., also from Arizona. The males are normal in size, having a wing expanse of  $2\frac{1}{2}$  in. (63 mm.); the females are somewhat larger than usual, all our specimens measuring 3 in. (60 mm.). The types are in coll. Barnes.

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GEOMETRID NEWS—DESCRIPTIONS OF TWO NEW  
HYDRIOMENAS.

BY L. W. SWETT, BOSTON, MASS.

*Hydriomena henshawi*, nov. sp.

Palpi short; expanse of wings 35 mm.

Colour of fore wings light ash-gray, speckled with black atoms; the space between the basal line and body of the same colour. Basal line bent outwardly from body at vein Sc. (Smith's Glossary), then curved slightly inwardly toward body, the curve ending quite a distance out on inner margin with a black dash; mesial space gray, with black atoms; median band black and irregular; intradiscal line running from costa to inner margin almost diagonally, with irregular curves between the veins; mesial or discal space with a faint spot; extradiscal line black, starting in a dash at costa, then curved outward with irregular points, as in *autumnalis*; outer margin pale gray with black atoms, the usual watery black band curved more regularly than in *autumnalis*. Fringe long, pale gray, with double points at base of fringe.

Hind wings pale gray, with the usual two faint extradiscal bands.

Beneath, the discal points on the fore wings are represented by two pale dashes, the lines above showing through faintly. The dots on the hind wings beneath are round; beyond, the two pale gray lines show through from above. The fringe is long and pale ash-gray, as above.

Type, 1 ♂, Nevada, Museum of Comparative Zoology, Cambridge, Mass. I take pleasure in naming this species after my kind friend, Mr. Samuel Henshaw, who has assisted me much in my work on the Hydriomenas.

This species resembles slightly *H. quinquefasciata* Packard.

(To be continued.)

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EXTENSIVE infection of the San José scale has been discovered on trees in the southern part of Wisconsin by Professor J. G. Sanders, of the University of Wisconsin. Professor Sanders, who is also State Nursery Inspector, reports that steps are being taken to control the pest and prevent its spreading beyond the area affected already.—[*Science*.

Mailed May 8th, 1912.



